

An International Journal
**computers &
mathematics**
with applications

Editor-in-Chief: Ervin Y. Rodin

List of Contents and Author Index

Volume 22, 1991



pergamon press

oxford · new york · seoul · tokyo

An International Journal
**computers &
mathematics** WITH APPLICATIONS

Editor-in-Chief:

Ervin Y. Rodin

Editorial Assistant: **Florence A. Schick**

Department of Systems Science and Mathematics
Campus Box 1040, Washington University
1 Brookings Drive, St Louis
MO 63130, U.S.A.

Tel.: 314-935-6007 or 935-5806

Fax: 314-935-4434

E.mail: rodin@rodin.wustl.edu

uunet!wuarchive!rodin.wustl.edu!rodin

rodin%rodin.wustl.edu@wugate.wustl.edu

Publishing Office

Pergamon Press plc, Pergamon House, Bampfylde Street,
Exeter EX1 2AH, England [Tel. (0392) 51558; Fax 425370].

Advertising and Subscription Offices

North America: Pergamon Press Inc., 395 Saw Mill River
Road, Elmsford, NY 10523, U.S.A.

Rest of the World: Pergamon Press plc, Headington Hill Hall,
Oxford OX3 0BW, England [Tel. (0865) 794141; Fax 60285].

**Publication frequency: 24 issues per year (two volumes
per annum)**

Subscription Rates

Annual institutional subscription rate (1992): £805.00
(US\$1290.00). Two-year institutional rate (1992/93):
£1529.50 (US\$2451.00). Sterling prices are definitive. U.S.
dollar prices are quoted for convenience only, and are
subject to exchange rate fluctuation. Prices include postage
and insurance and are subject to change without notice.
Subscription rates for Japan are available on request.
Members of the *American Mathematical Society* may order
personal subscriptions at a concessional rate, details of this
rate are available upon request.

Back Issues

Back issues of all previously published volumes, in both
hard copy and on microform, are available direct from
Pergamon Press offices.

Copyright © 1991 Pergamon Press plc

It is a condition of publication that manuscripts submitted
to this journal have not been published and will not be
simultaneously submitted or published elsewhere. By
submitting a manuscript the authors agree that the copy-
right for their article is transferred to the publisher if and
when the article is accepted for publication. However,
assignment of copyright is not required from authors who
work for organizations which do not permit such assign-
ment. The copyright covers the exclusive rights to reproduce
and distribute the article, including reprints, photographic
reproductions, microform or any other reproductions of
similar nature and translations. No part of this publication

may be reproduced, stored in a retrieval system or trans-
mitted in any form or by any means, electronic, electrostatic,
magnetic tape, mechanical, photocopying, recording or
otherwise, without permission in writing from the copyright
holder.

Whilst every effort is made by the publishers and editorial
board to see that no inaccurate or misleading data, opinion
or statement appears in this journal, they wish to make it
clear that the data and opinions appearing in the articles
and advertisements herein are the sole responsibility of the
contributor or advertiser concerned. Accordingly, the pub-
lishers, the editorial board and editors and their respective
employees, officers and agents accept no responsibility or
liability whatsoever for the consequences of any such
inaccurate or misleading data, opinion or statement.

In order to make this issue/volume available as economi-
cally and as rapidly as possible, the authors' typescripts
have been reproduced in either their original or reprocessed
T_EX format. The authors/Texnological Associates are fully
responsible for the quality and content of the text.

**PHOTOCOPYING INFORMATION FOR
USERS IN THE U.S.A.**

The Item-fee Code for this publication indicates that auth-
orization to photocopy items for internal or personal use is
granted by the copyright holder for libraries and other users
registered with the Copyright Clearance Center (CCC)
Transactional Reporting Service provided the stated fee
for copying beyond that permitted by Section 107 or 108 of
the U.S. Copyright Law is paid. The appropriate remittance
of \$3.00 per copy per article is paid directly to the Copyright
Clearance Center Inc., 27 Congress Street, Salem, MA 01970,
U.S.A. The copyright owner's consent does not extend to
copying for general distribution, for promotion, for creating
new works, or for resale. Specific written permission must be
obtained from the publisher for such copying.

The Item-fee Code for this publication is:
0097-4943/91 \$3.00 + 0.00

List of Contents

NUMBER 1

- | | |
|---|--|
| A. G. Ramm and P. Li | 1 Numerical solution of some integral equations in distributions |
| C. Hwang, M.-J. Lu and L. S. Shieh | 13 Improved FFT-based numerical inversion of Laplace transforms via fast Hartley transform algorithm |
| L. S. Shieh, J. L. Zhang, and N. P. Coleman | 25 Optimal digital redesign of continuous-time controllers |
| A. C. R. Newbery and T. S. Garrett | 37 Interpolation with minimized curvature |
| D. Y. Kwak and S. Son | 45 Prime sample scheme for almost sure convergence of a Galerkin approximation |
| R. Venkatesan and S. Al-Bassam | 49 New techniques for constructing t-ED/d-ED/AUED and t-EC/d-ED/s-UED codes |
| R. E. Kalaba and F. E. Udvardia | 67 An adaptive learning approach to the identification of structural and mechanical systems |
| | 77 Book Reports |

NUMBER 2

- | | |
|--|--|
| B. F. Esham, Jr. and E. G. Yanik | 1 Galerkin methods for a singularly perturbed hyperbolic problem with nonlocal nonlinearity |
| H. S. Green, A. J. Bracken and L. Bass | 23 Harmonic functions satisfying a radiation boundary condition |
| P. K. Srimani, B. P. Sinha, B. B. Bhattacharya, and S. Ghosh | 39 Properties of a class of trivalent network graphs and optimal routing |
| J.-D. Lee, Y.-C. You, J.-Y. Lee, C.-H. Chen, and C.-N. Shyi | 49 A fast method for cylindrical object location determination |
| S. K. Srinivasan and R. Vasudevan | 59 Particle multiplicity distribution a la invariant imbedding and natural scaling |
| D. Greenspan | 73 The error in quasi-quantum mechanical calculations |
| A. A. Ungar | 81 Errata to "A unified approach for solving quadratic, cubic and quartic equations by radicals" |
| | 83 Book Reports |

NUMBER 3

E. L. Wachspress	1 Polynomial bases for algebraic elements
E. L. Wachspress	11 C^1 rational finite elements
P. L. Powar and R. Rao	17 A counterexample of the construction of C^1 -rational finite element due to Wachspress
H. P. Dikshit and A. Ojha	23 Dimensions of spaces of Wachspress type C^1 -rational finite elements
L. E. Garey and R. E. Shaw	27 Algorithms for the solution of second order Volterra integro-differential equations
L. Noakes	35 Adapting functions to experimental measurements
P. Glaister	45 A TVD finite difference scheme with non-uniform meshes and without upstream weighting
F. Zhang	59 A hyperbolic tangent quadrature rule for solving singular integral equations with Hadamard finite part integrals
R. P. Manohar and T. Y. Ngai	75 Automated allocation of mesh points for stiff two-point boundary value problems
H. G. Khajah and E. L. Ortiz	81 Upper and lower error estimation for the Tau method and related polynomial techniques
	89 Book Reports

NUMBER 4/5

MULTIDIMENSIONAL INVERSE PROBLEMS

A. G. Ramm	vii Preface
	1. INVERSE PROBLEMS
A. G. Ramm and O. L. Weaver	1 3D inverse scattering
M. I. Belishev and Y. V. Kurylev	27 Boundary control, wave field continuation and inverse problems for the wave equation
I. Masaru	53 A special Green's function for the biharmonic operator and its application to an inverse boundary value problem
Z. Sun	67 Uniqueness for formally determined inverse boundary value problems
D. Gurarie	81 Multiparameter averaging and inverse spectral problem for anharmonic oscillators in \mathbb{R}^n

- P. I. Etingof 93 Inverse problems of potential theory and flows in porous media with time-dependent free boundary

2. TOMOGRAPHY, INTEGRAL GEOMETRY

- A. G. Ramm 101 Inversion of limited-angle tomographic data
- A. G. Ramm 113 A problem of integral geometry
- F. R. Miller 119 Characterizing principal curvature data as functions of the normal vectors and determining the surfaces

3. NUMERICAL TREATMENT OF INVERSE PROBLEMS

- S. Gutman and L. W. White 125 The estimation of L^∞ diffusion coefficients in the parabolic equations
- P. Maponi, L. Misici, and F. Zirilli 137 An inverse problem for the three dimensional vector Helmholtz equation for a perfectly conducting obstacle
- W. W. Symes 147 A differential semblance algorithm for the inverse problem of reflection seismology

NUMBER 6

- J. Bhasker and T. Samad 1 The clique-partitioning problem
- Y.-C. Hsueh 13 A unifying approach to the structures of the stable matching problems
- D. S. Dendrinos 29 Asymptotic stability and quasi-periodicity in form and evolution of model socio-spatial structures
- T. D. Kelly 47 Particle modelling of an elastic arch in three dimensions
- G.-H. Chen, D.-R. Duh and C.-C. Hsu 93 An algorithm paradigm for incomplete hypercubes
- A. G. Ramm and V. I. Fabrikant 97 Justification of Fabrikant's method for solving mixed problems of potential theory

NUMBER 7

- G. S. Guram and M. Anwar Kamal 1 Three-dimensional micropolar flow near Saddle and Nodal points of attachment
- A. Marciniak and D. Greenspan 11 Arbitrary order, Hamiltonian conserving numerical solutions of Calogero and Toda systems
- P. Favati and G. Lotti 37 Parallel algorithms for matrix polynomial division
- M. Muraskin 43 The determinant of g_{ij} in Aesthetic Field Theory

G. Stoyan and R. Stoyan	55	Colouring the discretization graphs arising in the multigrid method
V. I. Sokolov	63	The "natural" hierarchy of symmetry elements based on the intrinsic property of dimensionality and the corresponding tree of the symmetry groups
K. J. Bunch and R. W. Grow	65	A simple method to generate test matrices of known eigenvalue or singular value spectra
G. Terdik	69	Bilinear state space realization for polynomial stochastic systems
V. Piterbarg and V. Taran	85	Exact asymptotics for large deviation probabilities of normalized Brownian bridge with applications to empirical processes
E. J. Dean and P. Gubernatis	93	Pointwise control of Burgers' equation—a numerical approach

NUMBER 8

M. D. Vose	1	Piecewise linear models of processor utilization
M. L. Baart and R. J. Y. McLeod	11	Continuous quadric patch approximation of curved surfaces
P. J. Szablowski	21	Minimization of quadratic functionals on cones in Hilbert spaces
P. Glaister	35	A Riemann solver for compressible flow of a real gas in a Lagrangian frame
N. U. Ahmed	41	Stability of limit measures induced by stochastic differential equations on Hilbert space
G. Choudury and P. Korman	49	Computation of solutions of nonlinear boundary value problems
G. Adomian, R. Rach and R. Meyers	57	Numerical algorithms and decomposition
C. K. Koç	63	An improved algorithm for mixed-radix conversion of residue numbers
M. D. Gunzburger and J. S. Peterson	73	Predictor and steplength selection in continuation methods for the Navier-Stokes equations
D. Greenspan	83	Three-dimensional fluid microdrop interaction in the nucleation of raindrops
G. Adomian	91	Solving frontier problems modelled by nonlinear partial differential equations
G. Adomian	95	Errata to "A review of the decomposition method and some recent results for nonlinear equations"

NUMBER 9

A. K. Bisoi	1	A Maple program to generate orthonormal polynomials
M. Hosseini, A. Abadi and E. L. Ortiz	7	A Tau Method based on non-uniform space-time elements for the numerical simulation of solitons
G. Ugrin-Šparac	21	Two simulation models of the birthday problem and certain consequences
G. Resta	27	The average parallel complexity of Cholesky factorization
A. E. Köhler	35	A fuzzy symmetry concept for forms with imperfect symmetries
L. T. Watson and C.-Y. Wang	51	Large deformations of rotating polygonal space structures
N. Doual, J. L. Howland and R. Vaillancourt	61	Selective solutions to transcendental equations
T. R. Taha	77	A numerical scheme for the nonlinear Schrödinger equation
M.-Z. Qin and W.-J. Zhu	85	Canonical Runge-Kutta-Nyström (RKN) methods for second order ordinary differential equations
	97	Book Reports

NUMBER 10

E. Y. Rodin	1	Editorial
J. C. Lagarias	3	Effects of misspecification of lag structure in certain two-variable distributed lag models
H. E. Salzer	25	Confluent Prony approximation
R. E. Marshak	33	From symmetry to dynamics in modern particle physics
K. Coolsaet and V. Fack	45	Total exchange algorithms on 'sandwich graphs'
J. A. Winnie	49	Computing structure: Sets, structures, and invariants in LISP
P. Shi, M. Shillor and Z.-L. Zou	65	Numerical solutions to one-dimensional problems of thermoelastic contact
M. S. Petković and Z. M. Marjanović	79	A class of simultaneous methods for the zeros of analytic functions
J. H. Freilich and E. L. Ortiz	89	Upper and lower error estimation for the Tau Method: Some remarks on a problem of rational approximation

F. Calio', M. Frontini and G. V. Milovanović	99	Numerical differentiation of analytic functions using quadratures on the semicircle
M. J. Chambers	107	Forecasting discrete stock and flow data generated by a second order continuous time system
W. J. Gilbert	115	The complex dynamics of Newton's method for a double root
V. del Olmo and R. Fuster	121	Some iterative methods related to Frobenius norm minimization
J.-S. Chiang and M. Lu	127	Floating-point numbers in residue number systems

NUMBER 11

E. Y. Rodin	1	Speed of publication—An editorial
Y. Yavin	3	Open-loop evasion strategies in a pursuit-evasion problem in a reduced state space
J. C. Lopez-Marcos	15	An upwind scheme for a nonlinear hyperbolic integro-differential equation with integral boundary condition
C.-G. Huang	29	The explicit solutions of the Sturm-Liouville problem
S. Y. Yan	39	Declarative testing of logic databases
J. B. Nixon and B. J. Noye	47	Explicit three-point three-level FDMs for the one-dimensional constant-coefficient advection-diffusion equation
L. Hou and H. Manouzi	59	Solving the Navier-Stokes equations by Laplacians: An optimal control approach
Q. Zou	69	An observation on Gauss elimination
J. E. Moore, II, M. Kim, J.-G. Seo, Y. Wu and R. Kalaba	71	Linear programming, recurrent associative memories, and feed-forward neural networks
	91	Retraction

NUMBER 12

E. Y. Rodin	1	Speed of publication—An editorial
P. N. Tandon, P. Nirmala, M. Tewari and U. S. Rana	3	Analysis of nutritional transport through a capillary: Normal and stenosed
K. J. Cheng	15	Symbolic finite element analysis using computer algebra: Heat transfer in rectangular duct flow
J. Parisi	23	Global symmetry aspects of a compartmentalized reaction-diffusion system

P. N. Tandon, A. Chaurasia, V. K. Jain and T. Gupta	33	Application of magnetic fields to synovial joints
P. Glaister	47	An isentropic flow algorithm with body fitted meshes
R. J. Li and E. S. Lee	55	An exponential membership function for fuzzy multiple objective linear programming
I. R. Hentzel and D. P. Jacobs	61	A dynamic programming method for building free algebras
S.-K. Lin	67	Time symmetry and thermodynamics
E. G. Read, J. A. George, C. H. Bannister and R. J. Kaye	77	Explanatory note to the editors
M. R. Ebrahimpour, J. F. Dorsey and S. G. Demko	79	An acceleration technique for the Newton solution of quadratic equations
	89	Book Reports

**Reproduced with the permission of Pergamon Press Inc., by University
Microfilms Inc. Duplication or resale without permission is prohibited.**

